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10/536,599	07/19/2005	Yasuhiro Watanabe	112857-456	9306

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EXAMINER	
WANG, EUGENIA	
ART UNIT	PAPER NUMBER
1795	

NOTIFICATION DATE	DELIVERY MODE
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

chicago.patents@klgates.com

Office Action Summary	Application No.	Applicant(s)	
	10/536,599	WATANABE ET AL.	
	Examiner	Art Unit	
	EUGENIA WANG	1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *02 September 2009*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *42-82* is/are pending in the application.

4a) Of the above claim(s) *64-80 and 82* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *42-63 and 81* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on *02 September 2009* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. In response to the amendment received September 2, 2009:

a. Claims 42-82 are pending with claims 64-80 and 82 being withdrawn as being drawn to an unelected species.

b. The previous objections to the drawings have been withdrawn in light of the amendment.

c. The objection to the claims have been withdrawn in light of the amendment.

d. The previous 112(2) rejections have been withdrawn in light of the amendment.

e. With respect to 112(6), it is submitted that means plus function still has not been properly invoked (details below), and thus the case is necessarily given the interpretation that 112(6) is not being invoked.

f. The core of the rejection of record has been maintained, with slight changes made in light of the amendment. All changes made to the rejection are necessitated by the amendment, thus the action is final.

Drawings

2. The drawings were received on September 2, 2009. These drawings are acceptable.

35 USC § 112, Sixth Paragraph

3. Although claims 42, 46, 54, 55, 57, 58, 62, 63, and 81 use “means for” language. Means for has not been properly invoked, as the claim language fails the three prong test, specifically that “the phrase "means for" or "step for" must not be modified by sufficient structure, material, or acts for achieving the specified function” (see MPEP §2182(I)). Reasoning with respect to why 112(6) has not been properly invoked is set forth below:

a. Claims 42 and 81 recite "a gas flow means for sucking." Sucking necessarily modifies the means for with an act of achieving, as sucking requires some sort of means that provides gas flow means by the act of sucking (i.e. fan, compressor, etc.), while "gas flow,” what the means is for, can be achieved by, for example channels within a bipolar plate. Accordingly, “sucking” does impart acts for achieving the specified function. Further structure is set forth when it is defined that “the cooling means is driven independently from said gas flow means.” By defining the means (cooling and gas flow) as being separate, structure is imparted to both the gas flow means and the cooling means.

b. Claims 42 and 81 recite “a cooling means for sucking said oxidant…wherein said cooling means is driven independently from said gas flow means so as to cool said heat radiation unit." Such claim language specifically imparts structure to the cooling means, as (1) oxidant is defined as what does the cooling and (2) it is defined to be driven independently from the gas flow means. Defining oxidant as the coolant does impart structure/acts for achieving the

means for (which is just cooling), as other acts may achieve cooling, such as the heat radiation unit or the use of for example water as a coolant. Additionally (as with above), by defining the means (cooling and gas flow) as being separate, structure is imparted to both the gas flow means and the cooling means.

c. Claim 54 claims a “water discharge means for discharging water.” However, later in claim 54 the discharging is said to be done by generating a difference in pressure, and thus imparts structure and acts for achieving the specified function. The recitation with respect to “generating a difference in pressure" imparts structure and acts for achieving, as it clearly defines an act for achieving "discharging water.” The recitation of pressure is indicative of some sort of pressure valve, whereas other ways to discharge water (without using pressure) exist, such as thermally activated valves.

d. Claim 55 further imparts structure/acts for achieving "discharging water" by "a water discharge means" by claiming that the discharge means “opens a part of the discharge passage to the atmosphere,” which clearly modifies the means for with structure/acts for achieving (having a discharge passage that is opened and closed).

e. Claim 57 has a “means for detecting”, wherein claims 58 and 59 impart structure/acts for achieving the detecting. For example, claims 58-59 require the detection of a temperature and/or humidity, while claim 59 further imparts structure by claiming placements of such means. The placements impart

structure, as a plurality of detectors is defined as the "means for detecting." Accordingly "means for detecting" is improperly defined.

Since many of the claims fail to properly invoke means plus function (as set forth above), most notably the independent claims (in which the dependent claims are based on), the application as a whole is not seen to properly invoke 112(6). Thus for the prosecution of the application, 112(6) has not been granted (due to the outstanding issues set forth above).

Response to Arguments

4. Applicant's arguments filed September 2, 2009 have been fully considered but they are not persuasive.

Applicant argues that the amendments to claims 42 and 81 remove ambiguity as to 112(6).

Examiner respectfully disagrees. Although means for has been applied to cooling (thus clearing up one ambiguity), the added claim language limits the claim in such a manner that the 3-prong test is no longer met. (See 3(a) and 3(b) above for full details.) Accordingly, 112(6) has not been properly invoked.

Applicant argues that the recitation that "water discharge means discharges water by generating a difference in pressure" and that the discharge means "opens part of the discharge passage to the atmosphere" (claims 54-55) further define the function and do not impart structure.

Examiner respectfully disagrees. It is emphasized that "the phrase "means for" or "step for" must not be modified by sufficient structure, material, or acts for achieving

the specified function" (see MPEP §2182(I)). It is unsure how requiring a specified act (using pressure) which physically defines how the structure of the means (requires a structure that must be able to open a part of the discharge passage to the atmosphere) does not impart "structure" or "acts for" achieving the specified function. Accordingly, the claim language in question does not only provide a function, as it imparts acts/structure to achieve the function. It is emphasized that 112(6) is used in such a manner such that the specification is used to cover the corresponding structure and its equivalents, and thus such structure cannot be cited within the claim language. Accordingly, the arguments are not found to be persuasive, and 112(6) is not seen as to be properly invoked.

Applicant argues that the fact that the detection means detects temperature and/or humidity and that it is the detection means is arranged at specific locations do not impart structure (and only further recite structures and locations, wherein the location of the means does not impart structure).

Examiner respectfully disagrees. The fact that the detection means detects humidity and/or temperature most definitely imparts structure. By stating that humidity and/or temperature must be detected, it sets forth an act that must be used to achieve the function (detection) and thus limits the structure of the detection means to a temperature or a humidity detector. However, other environmental conditions exist (such as pressure), wherein the structure of such a device would be different from that of a temperature or humidity detector. Furthermore, the locations of the detectors do not only provide locations for the means, they define how many means must exist, and

in such a fashion imparts a structure to the means (by stating that a plurality must exist to constitute the means). Accordingly, the claim language in question does not only provide a function, as it imparts acts/structure to achieve the function. It is emphasized that 112(6) is used in such a manner such that the specification is used to cover the corresponding structure and its equivalents, and thus such structure cannot be cited within the claim language. Accordingly, the arguments are not found to be persuasive, and 112(6) is not seen as to be properly invoked.

Claim Rejections - 35 USC § 103

5. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

6. Claim 42-45, 47-52, 56, and 62 are rejected under 35 U.S.C. 103(a) as being unpatentable over WO 00/14819 (Chizawa et al.) in view of US 2002/0028364 (Kaufmann). It is noted that US 6613467 is being relied upon as an English translation of the corresponding WO document.

As to claim 42, Chizawa et al. teach of a general fuel cell system, which has a plurality of fuel cells [4] which react electrochemically to create power (power generation units) (col. 1, lines 30-43; fig. 1). It is stated that oxygen is fed to the system (and thus some conduit containing oxygen gas must exist) (col. 1, lines 48-51). It is specifically noted that Chizawa et al. embodies such a typical fuel cell with modifications, as there is a statement as to only differences to the general fuel cell of fig. 1 will be described in their embodiments (col. 2, lines 26-28). In one particular embodiment, cooling means, specifically radiation fins [16], for radiating heat to the outer atmosphere (heat radiation

unit) is embodied (col. 5, lines 5-10; col. 12, lines 55-59; fig. 9). It is noted that the system has gas-feeding means (gas flow means) for the reactants (thus encompassing both oxidant and fuel), wherein the gas-feeding means feeds each reactant separately into the separator (col. 5, lines 5-10). It is noted that the oxidant gas (air embodied) is necessarily fed into a first intake port (on the power generation unit) such that the air can be delivered to the cathode (col. 1, lines 47-51; fig. 10). (Although such an intake port is not labeled in fig. 9, it can be seen as the unlabeled rectangles at the end of the stack in fig. 9, wherein these ports are in the same position as the other labeled embodiments; compare to figs. 2-8, wherein for example such ports are labeled in fig. 7, wherein fig. 8 shows the same type of delivery as that of fig. 10. Accordingly, such a first intake port would necessarily exist in the embodiment of fig. 9, or else the reactants would not be able to be delivered to the cells within the stack.) Fig. 9 shows that there are cooling fans [17] (cooling means) that direct (suck) air to cool the radiation fins [16] (heat radiation unit) (fig. 9; col. 12, lines 45-55). It can be interpreted that the openings defined by the radiation fins [56] constitute a composite second intake port (on the power generation unit, as it is attached to the fuel cell stack [9]), wherein, as such a place is near that of the first intake port (rectangular unlabeled sections, in fig. 9), that the composite second intake port is adjacent to the first intake port, barring specification as to what constitutes adjacent. Office personnel are to give claims their broadest reasonable interpretation in light of the supporting disclosure. *In re Morris*, 127 F.3d 1048, 1054-55, 44 USPQ2d 1023, 1027-28 (Fed. Cir. 1997). Also, limitations appearing in the specification but not recited in the claim are not read into the claim. See *In re*

Zletz, 893F.2d 319, 321-22,13 USPQ2d, 1320, 1322 (Fed. Cir. 1989). (It noted that the fans are necessarily driven independently from the gas flow means, as the reactants are line to the fuel cells (as state within col. 5, lines 5-10), and fig. 9 shows that the fans are directed to the stack externally (via the arrows).)

Chizawa et al. do not teach that the gas flow means has the structure such that oxidant gas is sucked.

However, Kaufmann teaches of a fuel cell system wherein specific means for oxidant delivery are set forth, including air delivered by a fan (which would constitute sucking the air in for delivery, as the air must be passed through/sucked through such means for delivery) (para 0016). Accordingly, Kaufmann shows that at the time the claimed invention was made, one of ordinary skill in the art would appreciate specified manners for which reactants (such as oxidant) can be delivered to a fuel cell system, wherein the use of a known gas feeding system for feeding the reactant (i.e. a fan for delivery of air, as taught by Kaufmann) in another fuel cell system (i.e. the one taught by Chizawa et al.) would have provided the predictable result of operating in the same manner (wherein air would be delivered as an oxidant for fuel cell function). Therefore it would have been obvious to one having ordinary skill in the art at the time the claimed invention was made to use the air delivery system of Kauffman in the system of Chizawa et al., as the use of a known air delivery means within a fuel cell system would have provided the predictable result of operating in the same manner (providing air, such that the fuel cell could produce power using the provided reactants).

As to claim 43, Chizawa et al. teach of a plurality of laminated fuel cells [6], wherein a each cell [4] (joint body) has electrodes (anode [1a] and cathode [1b]) with an ion conducting polymer electrolyte [3] in between the electrodes, as well as separators [5] that clamp either side (fig. 1; col. 1, lines 30-47).

As to claim 44, the ion conducting electrolyte as taught by Chizawa et al. is inherently proton conducting.

Where applicant claims a composition in terms of a function, property or characteristic and the composition of the prior art is the same as that of the claim but the function is not explicitly disclosed by the reference, the examiner may make a rejection under both 35 U.S.C. 102 and 103, expressed as a 102/103 rejection.

The fact that a certain result or characteristic may occur or be present in the prior art is not sufficient to establish the inherency of that result or characteristic. In re Rijckaert, 9 F.3d 1531, 1534, 28 USPQ2d 1955, 1957 (Fed. Cir. 1993).

"In relying upon the theory of inherency, the examiner must provide a basis in fact and/or technical reasoning to reasonably support the determination that the allegedly inherent characteristic necessarily flows from the teachings of the applied prior art." Ex parte Levy, 17 USPQ2d 1461, 1464 (Bd. Pat. App. & Inter. 1990)

In the case of the instant application the basis for expectation of inherency is that the fuel embodied is hydrogen (col. 1, lines 48-49), wherein the only cation available via the electrochemical reaction using this fuel is a proton. Thus, the proton must be an ion that is conducted through an electrolyte (or else no electric power can be generated).

This is also supported by col. 16, lines 15-20 and 29-32, which speak of having protons within the system, wherein the protons are transported.

The Examiner invites applicant to provide that the prior art products do not necessarily or inherently possess the characteristics of his [or her] claimed product.

Whether the rejection is based on inherency' under 35 U.S.C. 102, on prima facie obviousness' under 35 U.S.C. 103, jointly or alternatively, the burden of proof is the same...[footnote omitted]." The burden of proof is similar to that required with respect to product-by-process claims. In re Fitzgerald, 619 F.2d 67, 70, 205 USPQ 594, 596 (CCPA 1980) (quoting In re Best, 562 F.2d 1252, 1255, 195 USPQ 430, 433-34 (CCPA 1977)).

As to claim 45, although not specifically shown in fig. 9, Chizawa et al. teach that the cooling means via radiating (i.e. radiating fins of fig. 9) are provided with the separator (col. 5, lines 4-10). Accordingly, it can be interpreted that separator and cooling means via radiating are in some manner integral, wherein a section of it can be the central portion of the separator can be interpreted to be the separator, the outer (radiation portion) can be interpreted to be a heat radiation unit, and a portion defined in between (and overlapping the defined separator portion) can be interpreted to be the heat radiation unit.

As to claim 47, Chizawa et al., the fuel cells [4] (joint bodies) are placed in a stack and are laminated (fig. 1; col. 1, lines 57-63).

As to claim 48, Chizawa et al. teach that fuel to the anode [1a] in a planar manner (fig. 10) (and thus must have an in-plane conduit for delivery in the manner

seen in fig. 10). Since it is also stated that the reactants are fed via two different lines to the separator (col. 5, lines 4-10), the fuel must be fed to a place wherein the joint body and separator contact one another.

As to claim 49, Chizawa et al. teach that general fuel cells must have separators with grooves that feed reactive gases to each of the electrodes (thus indicative of a supply hole) (col. 1, lines 43-47). Additionally, in the first embodiment, it is indicated that in addition to un-reacted gas [101] being fed to the system, reacted gas [101] is taken out of the system (thus indicating some sort of discharge hole that is present), wherein both cathode and anode reactant gas is embodied (fig. 2A; col. 8, lines 56-65). Furthermore, exploded form of joint body in fig. 7, is relied upon to show the basics of fuel cell geometry (with respect to wherein it is specifically noted that the composite separator would include the bipolar version of the separator plate (oxidant and fuel flow sides together, as would be present in a stack). The path for the anode flow is denoted by [13a] and goes from one opening to another.

As to claim 50, it is noted that Chizawa et al. teach a plurality of fuel cells within a fuel cell stack [9], wherein it is indicated that the supply holes and discharge holes of the plurality of separators line up with one another to create supply passages and discharge passages, respectively (see fig. 1, fig. 2A, fig. 2B, and fig. 7 to see the embodiment of a stack and how the conduits line up).

As to claims 51 and 52, it is again noted Chizawa et al. teach that fuel cells have grooves for feeding reactant through the separator (col. 1, lines 43-47). Fig. 5 shows the embodiment of an exploded fuel cell, wherein dotted line [13a] represents anode

flow. As can be seen in fig. 5, the flow from one manifold to the other (one being the supply passage hole and the other being the discharge passage hole) is represented by a singular flow line, wherein the flow traverses over the length of the plate. In such a manner, the sectional area of the connecting means can be interpreted as the portion that leaves the manifold, and the sectional area of the in-plane conduit can be interpreted to be the entire length of the flow (from one manifold to the other). In such a manner, the connecting portion of the supply and discharge portion is smaller than that of the conduit (as the connecting portion cannot be larger than the supply or discharge manifold and the conduit traverses the length of the cell from one manifold to the other) (as applied to claims 51 and 52) (fig. 5).

As to claim 56, Chizawa et al. teach of radiation fins [16] and cooling fans [17] which work in conjunction to cool the stack (col. 12, lines 56-60). Therefore some stagnating must occur in proximity to the fins, or else cooling would not occur (barring specification as to what specifically constitutes stagnating). Office personnel are to give claims their broadest reasonable interpretation in light of the supporting disclosure. *In re Morris*, 127 F.3d 1048, 1054-55, 44 USPQ2d 1023, 1027-28 (Fed. Cir. 1997). Also, limitations appearing in the specification but not recited in the claim are not read into the claim. See *In re Zletz*, 893F.2d 319, 321-22,13 USPQ2d, 1320, 1322 (Fed. Cir. 1989). Furthermore, at the very least, the fans would be capable of being operated in such a manner, as the structure is the same as that claimed.

It has been held that the recitation of an element is "capable" of performing a function is not a positive limitation but only requires the ability to so perform. It does not constitute a limitation in any patentable sense. *In re Hutchinson,* 69 USPQ 138.

While intended use recitations and other types of functional language cannot be entirely disregarded. However, in apparatus, article, and composition claims, intended use must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim. In a claim drawn to a process of making, the intended use must result in a manipulative difference as compared to the prior art. In re Casey, 370 F.2d 576, 152 USPQ 235 (CCPA 1967); In re Otto, 312 F.2d 937, 938, 136 USPQ 458, 459 (CCPA 1963).

Claims directed to apparatus must be distinguished from the prior art in terms of structure rather than function. In re Danly, 263 F.2d 844, 847, 120 USPQ 528, 531 (CCPA 1959). See also MPEP § 2114.

The manner of operating the device does not differentiate an apparatus claim from the prior art. A claim containing a "recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus" if the prior art apparatus teaches all the structural limitations of the claim. Ex parte Masham, 2 USPQ2d 1647 (Bd. Pat. App. & Inter. 1987).

As to claim 62, as stated before, Chizawa et al. teach that both reactive gases (thus fuel) is supplied to their respective electrodes via separate lines, which causes

reaction with the oxidant (col. 5, lines 5-10; col. 1, lines 47-52). The flowing of such a gas is indicative that it comes from some sort of a unit, and thus it is inherent that a fuel storage unit inherently exists. The basis for inherency is that if hydrogen is flowed to the fuel cell, it must come from some sort of storage unit or else it would not be able to be supplied. Please see the rejection of claim 44 for the Office's policy on inherency. Furthermore, at the very least, the line that delivers the fuel can be interpreted to be a storage unit, as it does store the fuel momentarily prior to deliver. Office personnel are to give claims their broadest reasonable interpretation in light of the supporting disclosure. *In re Morris*, 127 F.3d 1048, 1054-55, 44 USPQ2d 1023, 1027-28 (Fed. Cir. 1997). Also, limitations appearing in the specification but not recited in the claim are not read into the claim. See *In re Zletz*, 893F.2d 319, 321-22,13 USPQ2d, 1320, 1322 (Fed. Cir. 1989). Lastly it is noted that this supplying happens while the fuel cell is being active with the reaction (taken to be when the power generation unit is being driven).

7. Claims 46, 54, and 55 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chizawa et al. in view of Kaufmann, as applied to claims 42, 43, 47, and 48 above, and further in view of US 6277508 (Reiser et al.).

As to claim 46, Chizawa et al. and Kaufmann do not teach of having water suction means that suctions and removes water from the conduit.

However, Reiser et al. teach of a similar fuel cell system, wherein a hydrophilic separator plate is inserted in between the anode and cathode flow field (see fig. 1; col. 4, lines 54-60). The motivation for doing so would be direct water from the cathode flow

field to the anode flow field, thus providing humidification to the anode flow field (col. 4, lines 61-64). This in turn would help manage the water content of the cathode flow field and would help prevent flooding (col. 4, lines 8-10). (Note the hydrophilic separator plate serves as suction means, as it sucks water from the cathode side, and thus the cathode conduit, and removes it to the anode side.) Therefore, it would have been obvious to one having ordinary skill in the art at the time the claimed invention was made to include a hydrophilic separator plate the cathode and anode flow field portions in order to help humidify the anode and in order to help properly manage water on the cathode side to prevent flooding.

As to claims 54 and 55, Chizawa et al. do not teach of a means for discharging water from an in-plane conduit (anode side) via pressure difference of the supply and discharge side (as required by claim 54), wherein the means opens a part of the discharge passage to the atmosphere to create such a pressure difference (as required by claim 54).

Reiser et al. teach of a similar fuel cell wherein different water management systems are embodied. Reiser et al.'s embodies an external system (similar to that of Chizawa et al.'s) wherein the water from the cathode reactant exhaust is used to humidify the fuel reactant (col. 4, lines 8-18). However, Reiser et al. describe an the use of an internal water recovery system, wherein such a system is understood by one of ordinary skill in the art and that one or a combination of the different subsystems can be used (col. 4, lines 23-28). Specifically, Reiser et al. embody the use of a water management system that is internal (wherein a hydrophilic separator helps bring water

from the cathode side to the anode side for proper humidification (col. 4, lines 54-64). Such a system has an anode recycling loop for better water management and an exhaust valve [67] which controls the ratio of what portion of the anode exhaust is recycled and what portion is exhausted from the system (thus to the atmosphere (as applied to claim 55)) (fig. 1; col. 5, lines 32-34 and 47-49). It is noted that the internal water management with an anode exhaust valve [67] is the means for discharging water from the system (as applied to claims 54), wherein it is inherent that such discharging is caused by a pressure differential within the supply and discharge passage of the anode side (as applied to claims 54-55). The basis for inherency is that the system, as described above, would not function if this were not the case (as the exhaust would not discharge from the exhaust valve if there was no force applied to the system (pressure differential between the supply and discharge passage) and would thus be stagnant). Furthermore, it is noted that this is the same structure embodied Applicant (fig. 1; hydrogen purge valve [54]), and thus would work in the same manner. Please see the rejection of claim 44 for the Office's policy on inherency. It is noted that the exhausting of the used reactant from the hydrogen side would result in any excess water being discharged as well, as it is in the exhaust (as applied to claim 55). The motivation for using the internal system, as embodied by Reiser et al. (with the specified discharging means) is that the use of such a system would improve the water management of a fuel cell system. At the very least, one of ordinary skill in the art would have the substitution of internal water management system of Reiser et al. for the external system as embodied by Chizawa et al. obvious, as such a substitution would have yielded the

predicable result of operating in the same manner (as a humidification/water management system). Raiser et al. specifically supports this view by teaching that known water management systems (including internal ones) are known in the art and be obvious to one of ordinary skill in the art to use any one or subcombination of such water management systems (col. 4, lines 23-28). Therefore it would have been obvious to one having ordinary skill in the art at the time the claimed invention was made to use the internal system of Reiser et al. with the external system of Chizawa et al. in order to improve water management or to replace the external system of Chizawa et al. with that of Reiser et al., as such a substitution would yield the predictable result of having a working water management system that provides proper humidification.

8. Claim 53 is rejected under 35 U.S.C. 103(a) as being unpatentable over Chizawa et al. in view of Kaufmann, as applied to claims 42, 43, 47, and 48 above, in further view of US 2001/0019793 (Tsuyoshi).

Chizawa et al. and Kaufmann do not teach that he connecting portion to the supply passage is smaller than the connecting portion to the discharge passage.

However, Tsuyoshi teaches a fuel cell with a collector plate (flow plate that allows for flow of reacting gases) (para 0007). Specifically, Tsuyoshi teaches that the supply hole (and thus the portion connecting to it) should be smaller than that of the discharge hole (and thus the connection portion to it) (para 0011). The fuel supply hole [71] is smaller than fuel discharge hole [72] (wherein although not particularly shown for the fuel, other flow connecting portions are shown are the same sizes as the hole that it corresponds to and would be expected to be the case for the fuel as well, as indicated

by fig. 1) (fig. 1; para 0036). The motivation for doing so is that water content in the gas passages can be discharged efficiently (para 0057, lines 12-16). Therefore it would have been obvious to one having ordinary skill in the art at the time the claimed invention was made to employ the use of larger discharge hole for fuel exhaust (and thus connection portion to such a passage) as taught by Tsuyoshi in order to provide better water discharging characteristics of the cell.

9. Claims 57-61 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chizawa et al. in view of Kaufmann, as applied to claims 42, 43, 47, and 48 above, in further view of US 2002/0180448 (Imamura et al.) and US 2002/0168556 (Leboe et al.)

As to claim 57, it is noted that Chizawa et al. teach that the unreacted gas is controlled to a temperature lower than that of the reacted gas (col. 4, lines 17-18). Accordingly, there is inherently some sort of detecting means for temperature (environmental condition) in the reactant inlet and reactant outlet portion of the system. The basis for inherency lies in the fact that inlet temperature cannot be controlled with respect to outlet temperature without being able to compare said temperatures. Accordingly, some sort of temperature detector inherently exists. Please see the rejection of claim 44 for the Office's policy on inherency. Furthermore, it is noted that Chizawa et al.'s invention is drawn toward heat exchange and water management (col. 4, lines 5-33).

However, neither Chizawa et al. nor Kaufmann specifically teach (a) environmental conditions being read by control means, wherein the control means controls gas flow means and (b) wherein control means controls cooling means.

With respect to (a), Imamura et al. teach of a similar fuel cell system, wherein water management is the focus (in order to keep the right amount of water in the system) (abs). Specifically, it teaches of having sensors, for example temperature sensors for detecting the temperature of the inlet of the air (oxidant), the temperature of the fuel cell, the outlet temperature of the air as well a humidity sensor in the air inlet, voltage and current sensors to determine the output of the fuel cell, as well as other sensors (not mentioned herein but seen in fig. 1) (para 0028; fig. 1). It is further noted that all of the sensors as well as the compressor [2] (which is linked to air distribution) are linked a controller (fig. 1; para 0029). Furthermore it is noted that the humidity in the air outlet is stream can be calculated via the controller (para 0063-0064). The motivation for employing the system of controls and sensors as taught by Imamura et al. to the system of Chizawa et al. is in order to accurately calculate the water content of the fuel cell in order that the water content can be adjusted properly (para 0006-0007; claim 14; claim 12). Therefore it would have been obvious to one having ordinary skill in the art at the time the claimed invention was made to employ the control system of Imamura et al to that of Chizawa et al. in order to impart a good control system to ensure an appropriate amount of water is available within the fuel cell for good operation.

With respect to (b), Leboe et al. provide the general teaching that heat transfer gas should be controlled to maintain the components [of a fuel cell] within preferred operating temperature ranges (para 0012). Accordingly, there is motivation to control the amount of cooling with respect to the temperature of the system components - to

keep the system within preferred operating temperature ranges. Therefore it would have been obvious to one having ordinary skill in the art at the time the claimed invention was made to use a controller to control the cooling fan of Chizawa et al. in conjunction with the temperature of the fuel cell system in order to maintain good operational temperature of the system (as taught by Leboe et al.)

It is noted that the combination above has rendered obvious the use of humidity and temperature sensors, as read by a controller, wherein such a controller controls a cooling means as well as air flow. Accordingly, it is submitted that the combination is at the very least capable of functioning in the same manner, as it is structurally the same as the claimed invention. Please see the rejection to claim 56 for the Office's position on "capable of" as applied to apparatus claims.

As to claim 58, the combination of Chizawa et al., Kaufmann, Imamura et al., and Leboe et al. render such a claim limitation obvious, since Imamura et al. teach of the temperature sensors and humidity sensor as seen in fig. 1.

As to claim 59, the combination of Chizawa et al., Kaufmann, Imamura et al., and Leboe et al. render such a claim limitation obvious. As seen in fig. 1 of Imamura et al., there are temperature sensors (T) on the oxidant supply to the fuel cell (power generation unit), fuel cell, and oxidant exhaust. Furthermore, there is humidity sensor (H) on the oxidant supply line. Finally, it is noted that that Imamura et al. calculates the humidity in the outlet air (para 0063-0064). Accordingly, the combination is capable of detecting all of the aforementioned conditions of the fuel cell.

As to claim 60, the combination of Chizawa et al., Kaufmann, Imamura et al., and Leboe et al. render such a claim limitation obvious. As set forth within the rejection to claim 57, the Imamura et al. renders obvious connecting the environmental condition sensors (temperature and humidity) as well as an air flow means (compressor [2]) to the controller (see fig. 1). Leboe et al. renders obvious connecting cooling means to a controller (see para 0012). Accordingly, the combination has all of the aforementioned connected to a controller (control substrate with a control circuit). Thus, the combination would at the very least be capable of operating in the claimed manner (controlling the driving of the gas flow means and cooling means based on the environmental condition), as it is structurally the same as the claimed invention. Please see the rejection to claim 56 for the Office's position on "capable of" as applied to apparatus claims.

As to claim 61, the combination of Chizawa et al., Kaufmann, Imamura et al., and Leboe et al. render such a claim limitation obvious. As set forth in the rejection to claim 57, Leboe et al. renders obvious connecting cooling means to a controller (see para 0012). Imamura et al. renders obvious connecting the environmental condition sensors (temperature and humidity), voltage/amp sensors (to measure output of the fuel cell), as well as an air flow means (compressor [2]) to the controller (see fig. 1), wherein Imamura et al. specifically teaches of the capability of calculating the amount of water in the system (para 0007). Accordingly, the combination renders obvious the same structure as claimed by the instant application. Thus, the combination would at the very least be capable of operating in the claimed manner (controlling the gas flow means and

cooling means according to the amount of water remaining in the power generation unit, which is calculated based on the environmental condition and the quantity of electric power generated by the power generation unit). Please see the rejection to claim 56 for the Office's position on "capable of" as applied to apparatus claims.

10. Claims 63 and 81 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chizawa et al. in view of Kaufmann, as applied to claim 42 above, in further view of US 2002/0051898 (Moulthrop, Jr. et al.).

As to claim 63, Chizawa et al. and Kaufmann do not teach having a pressure control means of the fuel supplied to the fuel cell (power generation unit).

However, Moulthrop, Jr. et al. teach of a fuel cell/electrolysis system, wherein the fuel cell operation version is similar to that of Chizawa et al. (proton using, see para 0003 of Moulthrop, Jr. et al.). It is specifically noted that Moulthrop, Jr. et al. teach of including a pressure regulator [68], which is placed on the hydrogen feed to the fuel cell system (para 0046; fig. 2). The motivation for providing a pressure regulator on the hydrogen inlet stream, as taught by Moulthrop, Jr. et al. is so that the fuel is provided at optimal operating pressure during fuel cell operation (para 0046; fig. 2). Therefore it would have been obvious to one having ordinary skill in the art at the time the claimed invention was made to include a pressure regulator on the hydrogen gas inlet in order to help keep the fuel cell system at its optimal operating pressure (and thus optimal conditions for optimal operation).

As to claim 81, Chizawa et al. teach of a general fuel cell system, which has a plurality of fuel cells [4] which react electrochemically to create power (power generation

units) (col. 1, lines 30-43; fig. 1). It is stated that oxygen is fed to the system (and thus some conduit containing oxygen gas must exist) (col. 1, lines 48-51). It is specifically noted that Chizawa et al. embodies such a typical fuel cell with modifications, as there is a statement as to only differences to the general fuel cell of fig. 1 will be described in their embodiments (col. 2, lines 26-28). In one particular embodiment, cooling means, specifically radiation fins [16], for radiating heat to the outer atmosphere (heat radiation unit) is embodied (col. 5, lines 5-10; col. 12, lines 55-59; fig. 9). It is noted that the system has gas-feeding means (gas flow means) for the reactants (thus encompassing both oxidant and fuel), wherein the gas-feeding means feeds each reactant separately into the separator (col. 5, lines 5-10). It is noted that the oxidant gas (air embodied) is necessarily fed into a first intake port such that the air can be delivered to the cathode (col. 1, lines 47-51; fig. 10). (Although such an intake port is not labeled in fig. 9, it can be seen as the unlabeled rectangles at the end of the stack in fig. 9, wherein these ports are in the same position as the other labeled embodiments; compare to figs. 2-8, wherein for example such ports are labeled in fig. 7, wherein fig. 8 shows the same type of delivery as that of fig. 10. Accordingly, such a first intake port would necessarily exist in the embodiment of fig. 9, or else the reactants would not be able to be delivered to the cells within the stack.) Fig. 9 shows that there are cooling fans [17] (cooling means) that direct (suck) air to cool the radiation fins [16] (heat radiation unit) (fig. 9; col. 12, lines 45-55). It can be interpreted that the openings defined by the radiation fins [56] constitute a composite second intake port (on the power generation unit, as it is attached to the fuel cell stack [9]), wherein, as such a place is near that of the first

intake port (rectangular unlabeled sections, in fig. 9), that the composite second intake port is adjacent to the first intake port, barring specification as to what constitutes adjacent. Office personnel are to give claims their broadest reasonable interpretation in light of the supporting disclosure. *In re Morris*, 127 F.3d 1048, 1054-55, 44 USPQ2d 1023, 1027-28 (Fed. Cir. 1997). Also, limitations appearing in the specification but not recited in the claim are not read into the claim. See *In re Zletz*, 893F.2d 319, 321-22,13 USPQ2d, 1320, 1322 (Fed. Cir. 1989). (It noted that the fans are necessarily driven independently from the gas flow means, as the reactants are line to the fuel cells (as state within col. 5, lines 5-10), and fig. 9 shows that the fans are directed to the stack externally (via the arrows).)

Chizawa et al. do not (a) teach that the gas flow means has the structure such that oxidant gas is sucked or (b) particularly state that the fuel cell is used with an electronic apparatus.

With respect to (a), Kaufmann teaches of a fuel cell system wherein specific means for oxidant delivery are set forth, including air delivered by a fan (which would constitute sucking the air in for delivery, as the air must be passed through/sucked through such means for delivery) (para 0016). Accordingly, Kaufmann shows that at the time the claimed invention was made, one of ordinary skill in the art would appreciate specified manners for which reactants (such as oxidant) can be delivered to a fuel cell system, wherein the use of a known gas feeding system for feeding the reactant (i.e. a fan for delivery of air, as taught by Kaufmann) in another fuel cell system (i.e. the one taught by Chizawa et al.) would have provided the predictable result of operating in the

same manner (wherein air would be delivered as an oxidant for fuel cell function). Therefore it would have been obvious to one having ordinary skill in the art at the time the claimed invention was made to use the air delivery system of Kauffman in the system of Chizawa et al., as the use of a known air delivery means within a fuel cell system would have provided the predictable result of operating in the same manner (providing air, such that the fuel cell could produce power using the provided reactants).

With respect to (b), Moulthrop, Jr. et al. show that the electricity (electric potential) generated during fuel cell operation is used to power an external load (electronic apparatus) (para 0005). Accordingly, the motivation for using the fuel cell system of Chizawa et al. in conjunction in a load would be use the electric potential created and not to waste it. Therefore it would have been obvious to one having ordinary skill in the art at the time the claimed invention was made to use the apparatus of Chizawa et al. in conjunction with a load in order to use the electricity generated and to not waste energy.

Response to Arguments

11. Applicant's arguments filed September 2, 2009 have been fully considered but they are not persuasive.

Applicant argues that Chizawa et al. does not disclose or suggest that its cooling fans suck oxidant gas into a second intake port disposed on the power generation unit adjacent to said first intake port, as the cooling fans are located “at a gate portion of the reactants”, wherein it is seen that the cooling fans are located across the top of the fuel cell stack rather than adjacent to the first intake port.

Examiner respectfully disagrees. As set forth in the rejection (and reiterated herein for clarity's sake), the following interpretation of the prior art has been taken: (1) The unlabeled rectangles at the ends of the stack in fig. 9 constitute the first port for the oxidant (these ports are in the same position as the other labeled embodiments; compare to figs. 2-8, wherein for example such ports are labeled in fig. 7, wherein fig. 8 shows the same type of delivery as that of fig. 10), wherein such a first intake port would necessarily exist in the embodiment of fig. 9, or else the reactants would not be able to be delivered to the cells within the stack. (2) Fig. 9 shows that there are cooling fans [17] (cooling means) that direct (suck) air to cool the radiation fins [16] (heat radiation unit) (fig. 9; col. 12, lines 45-55). (3) The openings defined by the radiation fins [56] constitute a composite second intake port (on the power generation unit, as it is attached to the fuel cell stack [9]). In such a manner, the first intake port (rectangular unlabeled sections, in fig. 9) is near, and thus adjacent to, the composite second intake port (plurality of openings defined by the fins), barring specification as to what constitutes adjacent. Office personnel are to give claims their broadest reasonable interpretation in light of the supporting disclosure. *In re Morris*, 127 F.3d 1048, 1054-55, 44 USPQ2d 1023, 1027-28 (Fed. Cir. 1997). Also, limitations appearing in the specification but not recited in the claim are not read into the claim. See *In re Zletz*, 893F.2d 319, 321-22,13 USPQ2d, 1320, 1322 (Fed. Cir. 1989). Nothing in the claim language precludes this interpretation. Thus, such arguments are not found to be persuasive, and the rejection of record is maintained.

With respect to the arguments regarding the 103 rejections, Applicant argues that the prior art used to obviate the rejected claims (Reiser et al., Tsuyoshi, Immamura et al., Leboe et al., Moulthrop Jr et al.) do not cure the deficiencies of the primary reference (Chizawa et al.). Applicant does not argue how the combination is not proper. Therefore, the Examiner maintains the obviousness rejections and upholds the rejection of the primary reference, as above.

Conclusion

12. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to EUGENIA WANG whose telephone number is (571)272-4942. The examiner can normally be reached on 7 - 4:30 Mon. - Thurs., EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached on 571-272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/E. W./
Examiner, Art Unit 1795

/PATRICK RYAN/
Supervisory Patent Examiner, Art Unit 1795